{{<P=41><C=06><S=extension><T=MC><M=2><L=1><X=F><id=001>}}

4161001

F E A sinusoidal a.c. flows through a resistor and the mean power dissipated by the resistor is P. If the frequency of the a.c. is doubled, which of the following expressions gives the new mean power dissipated by the resistor?

A P

B $\sqrt{2}\,P$

C $2P$

D $4P$

{{<P=41><C=06><S=extension><T=MC><M=2><L=1><X=F><id=002>}}

4161002

F E A steady voltage V and a sinusoidal alternating voltage with peak value V_0 is applied in turn to a resistor. The average power dissipated is the same in both cases. What is the relationship between V and V_0?

A $V_0 = \frac{V}{2}$

B $V_0 = \frac{V}{\sqrt{2}}$

C $V_0 = V$

D $V_0 = \sqrt{2}V$

{{<P=41><C=06><S=extension><T=MC><M=2><L=1><X=F><id=003>}}

4161003

F E The pointer deflection of an ammeter is proportional to the heating effect of the current. The ammeter is first calibrated by using a d.c. It is then used to measure an a.c. of r.m.s. value 10 A. What will be the reading of the ammeter?

A 5 A

B 7.07 A

C 10 A

D 14.1 A

{{<P=41><C=06><S=extension><T=MC><M=2><L=1><X=F><id=004>}}

4161004

F E Which of the following devices can operate normally with both a.c. and constant d.c.?

(1) Heating filament

(2) Transformer

(3) Resistor

A (1) and (2) only

B (1) and (3) only

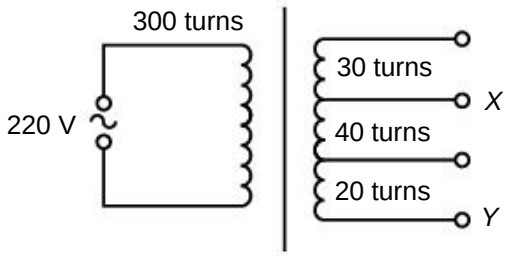
C (2) and (3) only

D (1), (2) and (3)

{{<P=41><C=06><S=extension><T=MC><M=2><L=1><X=H><id=005>}}

4161005

E The following figure shows a multi-tapped transformer.



What is the voltage across *XY*?

A 30 V

B 44 V

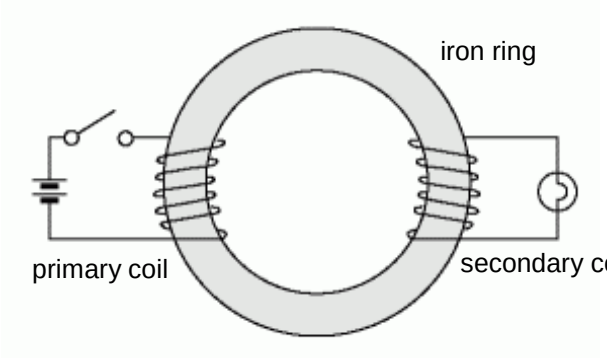
C 66 V

D 90 V

{{<P=41><C=06><S=extension><T=MC><M=2><L=1><X=H><id=006>}}

4161006

E In the following figure, two coils are wound on an iron ring. The primary coil is connected to a battery and a switch; while the secondary coil is connected to a lamp.



When the switch is closed, what happens to the lamp in the secondary coil?

A It lights up with gradually increasing brightness.

B It flashes at a constant frequency.

C It gives a flash of light.

D It does not light up.

{{<P=41><C=06><S=extension><T=MC><M=2><L=1><X=H><id=007>}}

4161007

E Which of the following is **not** an effect of stepping up the voltage in a transmission cable?

A The current in the cable is reduced.

B The resistance of the cable is reduced.

C The power loss in the cable is reduced.

D Cable of lower cost can be used.

{{<P=41><C=06><S=extension><T=MC><M=2><L=1><X=H><id=008>}}

4161008

E Which of the following devices converts mechanical energy to electrical energy when it operates?

A Battery

B Generator

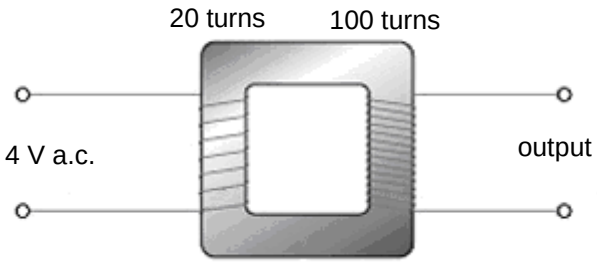
C Motor

D Transformer

{{<P=41><C=06><S=extension><T=MC><M=2><L=1><X=H><id=009>}}

4161009

E A 4-V a.c. supply is connected to the following transformer.



The current through the primary coil is 1 A and the power loss in the transformer is 0.8 W. What is the current through the secondary coil?

A 0.04 A

B 0.16 A

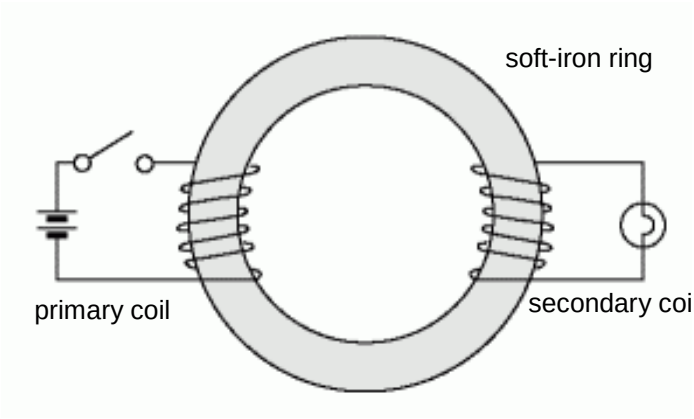
C 0.2 A

D 0.8 A

{{<P=41><C=06><S=extension><T=MC><M=2><L=1><X=H><id=010>}}

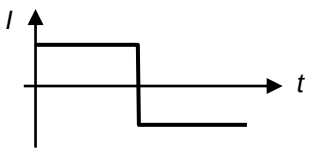
4161010

E Two coils are wound on a soft-iron ring. The switch is turned on and then off.

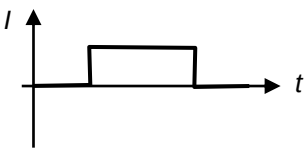


Which of the following graphs correctly shows the variation of the induced current through the light bulb with time?

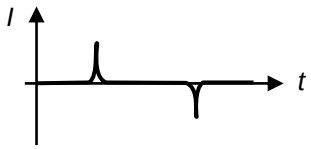
A



B



C



D

{{<P=41><C=06><S=extension><T=MC><M=2><L=1><X=H><id=011>}}

4161011

E Which of the following is an advantage of using high voltage for long distance power transmission?

A The transmission speed can be increased.

B The needs of some heavy industries, which operate at high voltages, can be fulfilled.

C The power loss in the transmission cable can be reduced.

D Overhead power cables can be used.

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=F><id=012>}}

4161012

★

F E A heater of resistance R operates with a sinusoidal alternating current of peak value I. Which of the following expressions gives the mean power output of the heater?

A $\frac{1}{2}I^2R$

B $\frac{1}{\sqrt{2}}I^2R$

C I^2R

D $\sqrt{2}I^2R$

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=F><id=013>}}

4161013

★

F E A heater dissipates energy at a rate of 1 kW when it is connected to the mains. The peak value of the mains voltage is 340 V. The heater is then connected to a 340-V d.c. supply. What is the rate at which the heater dissipates energy now?

A 0.5 kW

B 1 kW

C 1.41 kW

D 2 kW

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=F><id=014>}}

4161014

★

F E A 5-Ω resistor dissipates energy at a rate of 20 W when it is connected to an a.c. supply. Which of the following is the peak value of the current?

A 1.41 A

B 2 A

C 2.83 A

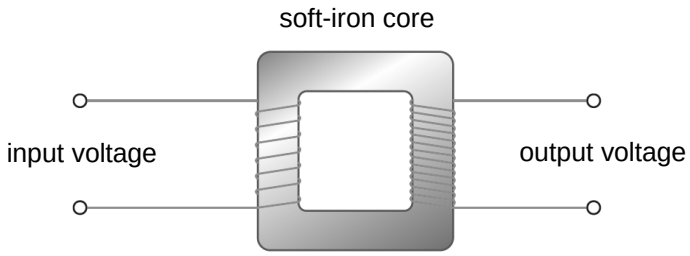
D 4 A

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=H><id=015>}}

4161015

★

E The following figure shows a simple transformer.



Which of the following method(s) can increase the efficiency of the transformer?

(1) Use a laminated soft-iron core.

(2) Replace the soft-iron core with highly conducting materials.

(3) Cover the whole transformer with heat insulating material to reduce heat loss.

A (1) only

B (2) only

C (1) and (3) only

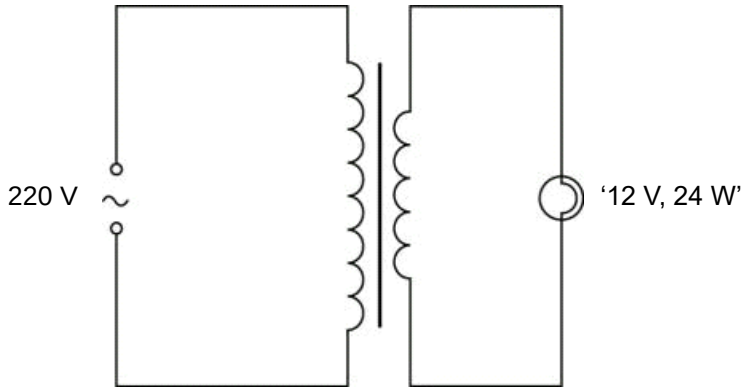
D (2) and (3) only

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=H><id=016>}}

4161016

★

E A light bulb rated at '12 V, 24 W' is connected to a transformer as shown in the following figure. An alternating voltage of 220 V is supplied to the primary coil and the primary current is 0.15 A.



If the light bulb operates at its rated value, what is the efficiency of the transformer?

A 5.45%

B 50%

C 72.7%

D Cannot be determined since the turns ratio of the transformer is not given.

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=H><id=017>}}

4161017

★

E The percentage loss of power in a transformer is 10%. The voltage across the primary coil and the current through the primary coil are 1.5 V and 5 A respectively. If the ratio of the number of turns in the primary and secondary coils is 1 : 20, what is the current through the secondary coil?

A 0.225 A

B 0.25 A

C 0.5 A

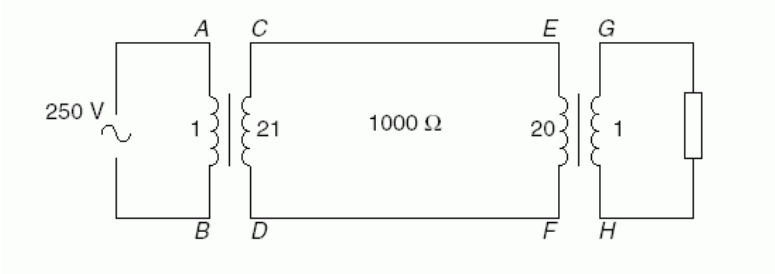
D 4.5 A

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=H><id=018>}}

4161018

★

E The following figure shows a power line for transmitting electrical power from a power station to a factory. The power line has a resistance of 1 kΩ and the current through the line is 0.25 A.



If the transformers are 100% efficient, what is the voltage across *GH*?

A 200 V

B 220 V

C 250 V

D 263 V

{{<P=41><C=06><S=extension><T=MC><M=2><L=3><X=F><id=019>}}

4161019

★★

F E The instantaneous value I (in A)of an alternating current at time t (in s) is given by the equation $I = \sqrt{2}\sin 20\pi t$. Which of the following descriptions are correct?

(1) The frequency of the a.c. is 10 Hz.

(2) The value of I varies between $-\sqrt{2}$ A and $+\sqrt{2}$ A.

(3) The r.m.s. value of the current is 1 A.

A (1) and (2) only

B (1) and (3) only

C (2) and (3) only

D (1), (2) and (3)

{{<P=41><C=06><S=extension><T=MC><M=2><L=3><X=H><id=020>}}

4161020

★★

E A transformer works at an efficiency of 80%. The primary voltage is 100 V and the turns ratio is 20 : 1. If the resistance of the secondary circuit is 50 Ω, what is the primary current?

A 0.005 A

B 0.006 25 A

C 0.01 A

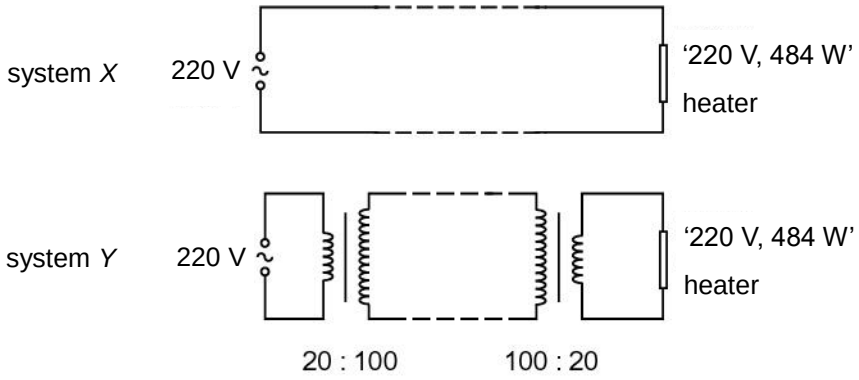
D 2 A

{{<P=41><C=06><S=extension><T=MC><M=2><L=3><X=H><id=021>}}

4161021

★★

E The figure below shows two different power transmission systems, *X* and *Y*.



The total resistance of the transmission cables in both systems are 10 Ω. What is the ratio of the power loss in system *X* to that in system *Y*? Assume there is no power loss in transformers.

A 10 : 1

B 15 : 1

C 20 : 1

D 25 : 1

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=H><id=022>}}

4161022

★

E

1st statement	2nd statement
In a transformer, the primary current increases as the resistance of the secondary circuit decreases.	In a transformer, the secondary current increases as the resistance of the secondary circuit decreases.

{{<P=41><C=06><S= extension ><T=MC><M=2><L=2><X=H><id=023>}}

4161023

★

E

1st statement	2nd statement
A step-up transformer can step up both voltage and current.	The efficiency of a transformer can never be greater than 100%.

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=H><id=024>}}

4161024

★

E

1st statement	2nd statement
Power loss in transmission cables can be reduced if the electricity is transmitted at a high voltage.	Reducing the power loss in transmission cables can increase the efficiency of the transformers connected.

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=H><id=025>}}

4161025

★

E

1st statement	2nd statement
In a step-down transformer, the primary current is larger than the	A step-down transformer has fewer turns in the secondary coil than in the

secondary current. primary coil.

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=H><id=026>}}

4161026

★

E

1st statement	2nd statement
A transformer is more efficient if thicker wires are used for its coils.	The energy loss in the coils of a transformer is reduced if thicker wires are used for its coils.

{{<P=41><C=06><S=extension><T=MC><M=2><L=2><X=H><id=027>}}

4161027

★

E

1st statement	2nd statement
A transformer is less efficient if the core is laminated.	The induced current in the core is reduced if the core is laminated.